NETWORK SWITCHING/CONCENTRATOR PROJECT

SCOPE - The scope and purpose of this paper is to outline actions undertaken and planned to enhance network message and data handling from the communications switch aspect.

REQUIREMENTS - There are three basic purposes to upgrading the switch/network interface components of the network:

A. To provide a data handling capability in the network to meet projected user needs.

B. To better utilize personnel and material resources.

C. To capitalize on the opportunities presented by recent and planned technical implementations.

At present, the network is typified by its narrative nature; i.e., processing discrete messages bound by communications formats and handled as units from the originating station to the recipient stations. Data handling, generally understood as a blocked/controlled mode of operation, does not exist. Only as the text of narrative messages does user data transit the network, allowing field stations an indirect method for accessing Headquarters data base systems.

The DDO and the DDA are, however, studying further application of data support to field stations for a variety of uses. As this application expands, communications requirements will also expand, to include support to data base storage, manipulation and interrogation. Effectively, communications must be provided eventually to support data communications to the major stations in the network.

Satellite technology offers an opportunity to upgrade communications linkage to a level that will serve most user needs, including data handling, for the foreseeable future.

Addition of data handling service commensurate with satellite transmission capability means changing from low-speed teletype operation to controlled network operation wherever needed. Both field terminals and network switches must be modified in order to continue the present level of narrative message support along with the requisite data transmission capability.

Controlling network support cost (operational and technical) is and must continue to be a prime consideration in the Office of Communications. Personnel cost is a major factor in the operation of the network, an expense that has been increased dramatically in recent years by the cost of staffing overseas positions. Because the number of items (messages and related actions) handled by field communicators is not expected to decrease significantly, economies can only result from the handling of items a lesser number of times and at a faster rate per item. Handling of data requirements in the existing narrative mode can only increase the workload factors and, it is felt, to a significant degree. The activities being undertaken in this project are, therefore, designed to prepare the network for optimized narrative message handling and simultaneously, to provide a transparent data capability.

Project Activity

1. A study contract is underway with the [redacted] Corporation for determining the tenability of the present switches and the characterization of the future network switches. The study is scheduled for completion on 15 October 1977. It will provide the decision making framework for any network changes. 25X1

2. Planning is underway to install [redacted]/ARS equipment at [redacted] to be used in developing a working model concentrator/front-end (C/FE) for controlled network interface to the MAX and data processing systems. Figures 1-4 conceptualize the MAX/concentrator implementation and its function in the network. The objectives are: 25X1 25X1

a. To establish the functional application of a controlled mode of operation in the existing network. Various controlled concentrator modes of operation are in use in other networks today. It is felt that there is significant benefit to such operation in our network, particularly in terms of data handling and decreasing operator workload. The basic purpose of

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the [redacted] C/FE exercise is to examine the concentrator mode of operation when overlaid into the network, its effect on operating principles and the constraints that may develop.

b. To provide a model for utilizing higher speed communications lines in both controlled and free-running modes, within planned and potential satellite terminal capabilities for non-AVD bandwidth.

c. To determine the necessary improvements to network terminals through the use of concentration techniques and line handling disciplines. This action is preliminary to providing interactive and transparent data handling capability between field stations and Headquarters. The action will include a quantitative study of the application of in-line multiple-path concentration of data and its impact on the network. In essence, how message and data traffic transmission can be combined while ensuring that the delivery of time critical material is not delayed.

d. To provide a model capability for interfacing switching systems and line equipment, including control consoles, crypto equipment, and satellite terminals. This capability would be used to implement Demand Line Assignment (DLA) operation, permitting medium/high-speed rotary communication with selected field stations using the satellite AVD channel.

e. To determine the feasibility of a field station multiple I/O device (mixer) to service a variety of user terminals. The network side of the mixer would use a single communications channel/crypto device to the concentrator, providing multiple use of channel resources.

f. To provide a capability for implementing a "dumb terminal, smart switch" environment. This concept is seen as the most effective means of reducing field station workloads by moving the formatting, numbering, control functions, etc., now performed in the field, to the network node. The "smart switch" does not exist today in the MAX/ARS

network configuration but the analogous precedent is the historical [redacted] 25X1
lateral network wherein the relay of all messages was the responsibility of the Signal Center. Essentially, the "dumb terminal, smart switch" concept means that transmission of messages to and from field stations would take place at the lowest possible level of formatting. For example, input/output at the field station could be effected at an OCR and printer treated as peripherals of the smart switch. OCR input received at the switch would be transferred to the smart switch subsystem (software) which would perform required communications formatting for onward relay. Addressee copy and confirmation copy of originating messages would be transmitted to the called station for action and record file.

Milestones

The action plan for the concentrator project is included as Attachment 1. This action plan is a revision of the original OC-E-02-77 action plan and does not include the Milestones for the switch study contracted to [redacted] 25X1
25X1 [redacted] The switch study Milestones are now constituted as objective number OC-E2.5-77. The restructuring was done to allow separate management of and reporting on the two phases of the overall project.

Next 4 Page(s) In Document Exempt

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